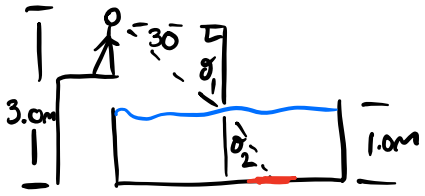
Ch. 23 P: 10, 12, 52

23.P. 52



Snells Law

$n_1 \sin\theta_1 = n_2 \sin\theta_2$

$n_1 = 1.00 \quad n_2 = 1.33$

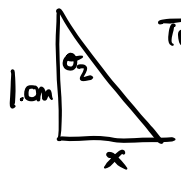
$\theta_1 = 60° \quad \theta_2 = 40.6°$

$\sin\theta_2 = \frac{n_1 \sin\theta_1}{n_2}$

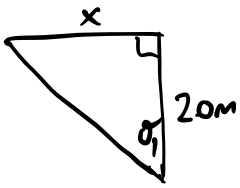
$\theta_2 = \sin^{-1}\left(\frac{n_1 \sin\theta_1}{n_2}\right)$

$\theta_2 = 40.62°$

Geometry:

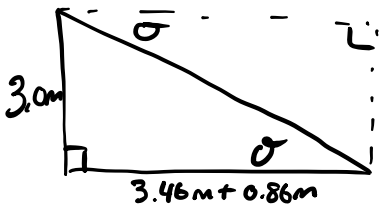


$\text{Tan}\theta = \frac{O}{A}$



$x = \text{Tan}\theta_2 = 0.86m$

$x = 2\text{Tan}\theta_1 = 3.46m$

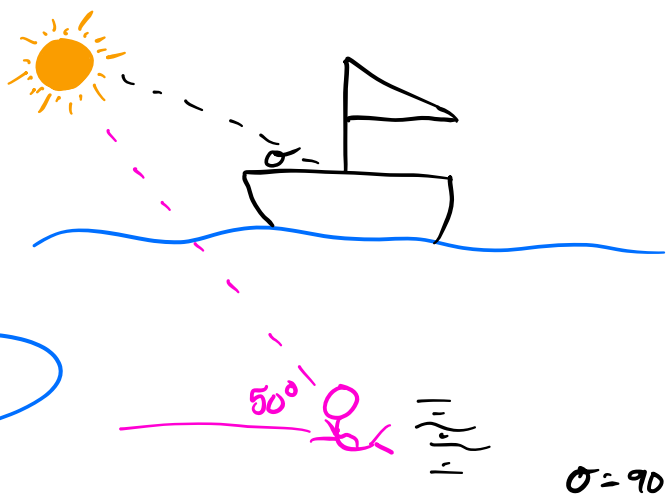


$\theta = \text{Tan}^{-1}\left(\frac{3m}{4.32m}\right)$

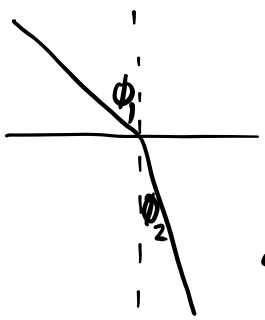
$\theta = 34.77°$

$\theta = 34.77°$

23.P. 12



$\theta = 31.25°$



$n_1 \sin\phi_1 = n_2 \sin\phi_2$

$n_1 = 1.00 \quad n_2 = 1.33$

$\phi_1 = \quad \phi_2 = 40$

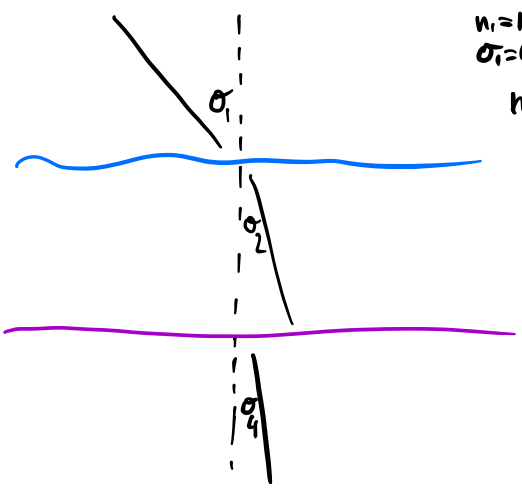
$\sin\phi_1 = \frac{n_2 \sin\theta_2}{n_1}$ ← 1.0

$\phi_1 = \sin^{-1}(n_2 \sin\theta_2)$

$\phi_1 = 58.75°$

$\theta = 90 - \phi_1 = 31.25°$

23.P. 10



$n_1 = 1.00 \quad n_2 = 1.33$

$\theta_1 = 60° \quad \theta_2 = 40.628°$

$n_1 \sin\theta_1 = n_2 \sin\theta_2$

$\sin\theta_2 = \frac{n_1 \sin\theta_1}{n_2}$

$\theta_2 = \sin^{-1}\left(\frac{n_1 \sin\theta_1}{n_2}\right)$

$\theta_2 = 40.628°$

$n_2 = 1.33 \quad n_3 = 1.50$

$\theta_2 = 40.63° \quad \theta_3 =$

$\theta_3 = \sin^{-1}\left(\frac{n_3 \sin\theta_3}{n_4}\right)$

$\theta_3 = 35.26°$

$\theta = 35.26°$